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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,727	09/28/2001	Lawrence C. Mouthrop JR.	PES-0033	3579
23462	7590	06/02/2004	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			KALAFUT, STEPHEN J	
			ART UNIT	PAPER NUMBER

1745

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/966,727

Applicant(s)

MOULTHROP ET AL.

Examiner

Stephen J. Kalafut

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 42-62 is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date several dates.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

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Claims 1-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no antecedent for "the water storage device" in claim 1. This claim also recites a "second water storage device", but no "first" such device. The term "inverted hydrogen storage device" in claim 2 is not understood, and is not defined in the specification. How is such a device "inverted"? Is this the "inverted hydrogen storage device" of claim 2 one possible variety of the "hydrogen storage system" in claim 1? Claim 15 is confusing as to whether the oxygen produced by the electrolysis module (second paragraph from the bottom) is the same as the "feed oxygen" recited in line 4 of this claim. Is the electrolysis module connected to the phase separation device? Claims 2-14 and 16-41 depend from claim 1 or claim 15 and would likewise be indefinite.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by McCoy (US 5,510,202), cited by applicants.

McCoy discloses a regenerative fuel cell system including a fuel cell module (205), a hydrogen storage system (325) in communication with the fuel cell hydrogen inlet via a line (335); an oxygen source (330) in communication with the fuel cell oxygen inlet via a line (340),

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the gaseous part of an oxygen/water separator (300), i.e., a first water storage device, and another line (345); an electrolysis module (305) in communication with the oxygen/water separator via a line (350); and an outlet leading from the electrolysis module to a hydrogen/water separator (320), which is connected to both a second water storage device (310) and the hydrogen storage system, which would also be the "inverted hydrogen storage device", to the extent that the term is understood. The system may also include an oxygen vent in communication with the electrolyzer and the atmosphere, which would also be in communication with the oxygen/water separator; and a metal hydride type of hydrogen storage device (column 4, lines 42-54).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCoy.

These claims differ from McCoy by reciting the particular form of the hydrogen storage device. Because the skilled artisan would be aware of the effect surface area has on the ability of alloys to absorb hydrogen, determining an appropriate form would be within the skill thereof. For this reason, this claim would be obvious over McCoy.

Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCoy in view of Chen *et al.* (US 5,985,474).

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These claims differ from McCoy by reciting either a controller or a power conditioner, with a load, are in communication with the fuel cell. Chen *et al.* disclose a fuel cell (40) which is controlled by a controller (80), and which is also connected via a power conditioner (70) to a load, such the power requirements for a building (column 6, lines 61-67). Because these allow heat and electricity to be supplied to the building in response to its needs (column 3, lines 8-10), it would be obvious to use the controller and power conditioner of Chen *et al.* with the fuel cell system of McCoy, to allow it to be used in a building.

Claims 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCoy in view of Gogins (US 4,302,684).

These claims differ from McCoy by reciting several sources of electricity for the electrolysis module. Gogins discloses hydro-electric, solar, and wind as means to generate electricity (column 1, lines 10-18), which can be used as supplements to hydrogen-storing electrolysis systems (column 2, lines 55-62). For this reason, it would be obvious to use electricity generated by hydro-electric, solar, and wind, as disclosed by Gogins, to provide power to the electrolysis module of McCoy.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCoy in view of Gogins as applied to claim 6 above, and further in view of Parker *et al.* (US 5,443,804).

The above combination does not provide for power conditioning means between the source of electricity and the electrolysis module. Parker *et al.* disclose power conditioning means (120) between an electrolysis cell (70) and a power source (110). To convert the power

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generated by the means disclosed by Gogins into a form useful for the system disclosed by McCoy, it would be obvious to use a power conditioner as disclosed by Parker *et al.*

Claims 3-5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The prior art cited above, below or by applicants, does not disclose the heat exchanger connected to the fuel cell and the electrolysis module in the manner recited by claim 3.

Claims 15-41 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action. The method of operating a regenerative fuel cell system, including oxygen from a separation device, and later from the atmosphere, in the way recited by claim 14, is not disclosed by the prior art.

Claims 42-62 are allowed. The method of operating a regenerative fuel cell system which includes maintaining a fuel cell, which uses hydrogen ions, where it may attain its operating temperature in at most 1 minute, is not disclosed by the prior art. European 1,006,601 teaches that it should be fast, but does not disclose a specific time. WO 99 44,254 teaches such a start-up time, but for solid oxide (oxygen ion-using) fuel cells. The prior art also does not disclose the step of introducing water from the fuel cell through a vortex tube to a phase separation device, a fuel cell system using a dryer for hydrogen and two pressure regulators, or a system with a hydrogen drier, an electrolysis module, and a hydrogen/water phase separator.

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Frank *et al.* (US 6,541,141) and Moulthrop *et al.* (US 5980726) disclose fuel cells with hydrogen driers.

The disclosure is objected to because of the following informalities: Drawing numerals 20, 24, 58 and 80 are not found in the specification. The numeral 48, on page 11, line 6, is not found in the drawings. Appropriate correction is required.

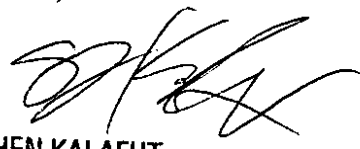
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286.

The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sjk


STEPHEN KALAFUT
PRIMARY EXAMINER
GROUP

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